petrographical description of the rocks and their metamorphoses. A sketch-map and five plates of microscopical sections accompany the paper, which is well summed up in German.—Geological observations on the Yug River, by B. Polyenoff.—On the *Spaniodon barbotii* deposits of Crimea and the Caucasus, by N. Andrusoff (also summed up in German).—*Zoology and Physiology*:—Notes on the ichthyology of the basin of the Amur, by N. Warpachowski and S. Hertzenstein, being an elaborate description of forty species, and their connection with kindred species in neighbouring regions (diagnoses in Latin, and the whole summed up in German).—On the Vertebrate fauna of the Balkhash depression, by M. Nikolsky. The most interesting conclusions of the author as to the recent geological history of the Balkhash depression have already been mentioned in NATURE. Now we have a full description of the fauna (39 mammals, 226 birds, 21 reptiles, 3 amphibians, and 16 fishes), together with an elaborate inquiry into the connection of this fauna with those of the neighbouring regions.—The *Percarina* and *Benthophilus* of the Sea of Azoff, by J. Kuznetsoff.—The minutes of proceedings contain several papers of great interest—namely, on a journey to Dutch India, by A. Korotneff; on the ornithology of Caucasus, by K. Rossikoff; on the fossils of the Nijne-udinsk cave, by I. Tcherski; on a journey to Turkestan and Bukhara, by S. Lidsky, &c.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, November 22.—"On the Magnetization of Iron and other Magnetic Metals in very Strong Fields." By J. A. Ewing, B.Sc., F.R.S., Professor of Engineering in University College, Dundee, and William Low.

The large magnet of the Edinburgh University, kindly lent by Prof. Tait, was used throughout the experiments, and allowed the authors to effect a high concentration of the magnetic force by using bobbins, the necks of which had a cross-sectional area of (in some cases) only $\frac{1}{1500}$ of the cross-sectional area of the magnet cores. By this means the induction $\mathfrak{B}$ was raised to the following extreme values:—

	C.G.S.
In wrought iron	45,350
,, cast iron	31,760
,, Bessemer steel	39,880
,, Vickers's tool steel	35,820
,, Hadfield's manganese steel	14,790
,, nickel	21,070
,, cobalt	30,210

The induction was measured by means of a coil consisting of a single layer of very fine wire wound upon the central neck of the bobbin. Outside of this coil, at a definite distance from it, a second coil was wound, and the magnetic force was determined in the annular space between the two. In a paper communicated to the Manchester meeting of the British Association, the authors showed that if the force so measured could be proved to have the same value as the magnetic force within the metal neck itself, it would follow that the intensity of magnetism $\mathfrak{I}$ had begun to diminish under the action of excessively strong fields, in the manner which Maxwell's extension of the Weber-Ampère theory of molecular magnets anticipates. In the present paper the authors discuss at some length the question of how far the magnetic force within the metal is fairly measurable by the magnetic force in the ring of surrounding air, and they show that, with the form of cones originally used, the force within the metal must have been less than the force outside, by an amount probably sufficient to explain the apparent decrease of $\mathfrak{I}$. The form of cone suited to give a uniform field of force with sensibly the same value in the metal neck and round it is investigated; and experiments are described in which the condition necessary for a uniform field was satisfied. The results of these experiments are conclusive in showing that no considerable change takes place in the value of $\mathfrak{I}$ (in wrought-iron) when the magnetic force is varied from about 2000 to 20,000 C.G.S. units. Throughout this range of force, the intensity of magnetism has a sensibly constant value of about 1700 C.G.S. units, which is to be accepted as the saturation value for wrought iron. The term saturation may be properly applied in speaking of the intensity of magnetism, but there appears to be no limit to the degree to which the magnetic induction may be raised.

The following are probable values of the intensity of magnetism when saturation is reached in the particular metals examined:—

	Saturation value of $\mathfrak{I}$.
Wrought-iron	1700
Cast-iron	1240
Nickel (with 0·75 per cent. of iron)	515
Nickel (with 0·56 per cent. of iron)	400
Cobalt (with 1·66 per cent. of iron)	1300

Experiments were also made with specimens of Vickers's tool steel, and other crucible steels, Whitworth's fluid-compressed steel, Bessemer steel, Siemens steel, and Hadfield's manganese steel. This last material, which is noted for its extraordinary impermeability to magnetic induction, was found to have a constant permeability of about 1·4 throughout the range of forces applied to it—namely, from 2000 to nearly 10,000 C.G.S.

Physical Society, November 24.—Prof. Reinold, President, in the chair.—Captain Abney read a paper on the measurement of the luminosity of coloured surfaces, which was illustrated by experiments. In a communication to the Royal Society, General Festing and the author have described a method of comparing the intensity of the light of different parts of the spectrum, reflected by various pigments, with that reflected from white, and luminosity-curves have been constructed, the areas of which give comparative measures of the total luminosities. This method of comparison is accurate, but requires considerable time, and the author has devised a more rapid process. The coloured surface whose luminosity is to be compared with white is placed beside a white patch within a dark box. A direct beam of light passes through an aperture in the box, and a black rod casts a shadow on the coloured patch; another beam from the same source is reflected at an angle, and forms a shadow of the same rod on the white patch, the junction of the two shadows coinciding with that of the two surfaces to be compared. In the path of the direct beam is placed a rotating disk with angular openings, adjustable whilst rotating by a simple lever, and by this means the white patch can be made to appear too light and too dark in rapid succession. By gradually diminishing the range of oscillation of the lever, a position of equal luminosities can be found. The coloured surface is now replaced by a white one, and the adjustment again made; and from the angular apertures required in the two cases the relative luminosities are determined. Comparisons made in this way (the numbers relating to which are given in the paper) with emerald green, vermilion, French ultramarine, &c., gave results in close agreement with those deduced from the luminosity-curves obtained by the spectrum method. In reply to questions, Captain Abney said the spectrum method was the more accurate, and could be relied on to 1 per cent. The new method gave results within 2 per cent., showing that the eye is very sensitive to small changes of luminosity when such changes take place in rapid succession.—Prof. Rücker made a communication on the suppressed dimensions of physical quantities. In arranging a system of dimensional equations for thermal quantities, the question arises as to what are the dimensions of temperature. A degree of temperature, as measured by the ordinary arbitrary method of the mercurial thermometer, is not affected by changes in the units of length, mass, and time; but the numerical values of thermal quantities (J, for instance) depend on the scale of temperature adopted, say Centigrade or Fahrenheit. Two courses seem open, either of which renders a complete system of thermal dimensional equations possible: (1) temperature may be considered as a measure of energy, as in the kinetic theory of gases, and may be expressed as the energy of translation of a standard number of molecules (say that number contained in 1 cubic centimetre of air at standard pressure and temperature); or (2) temperature may be considered as a secondary fundamental unit. If the first be adopted, the dimensions of specific heat become M^{-1}, and the temperature of 0° C. is expressed by $1·5207 \times 10^6$ ergs. If a practical unit corresponding to $\frac{10^5}{18}$ ergs be adopted, this new unit of temperature will coincide with the Centigrade degree to about 1 part in 3000. The chief objection to such a definition of temperature is that the above relation between temperature and energy is not yet proved to hold for liquids and solids. If the second course be adopted, the dimensions of all thermal quantities may be expressed in terms of M, L, T, and θ, where θ is the unit of temperature. Attention was directed to the difficulties students generally experience on finding the dimensions of the same electrical quantities to be different, according as they are expressed in electro-static or electro-magnetic measure, and that different quantities may have the same dimensions. The anomalies are shown to be due to the suppression of the dimensions of specific inductive capacity and permeability, each being called unity in air. By retaining K and μ in the dimensional equations, the author thinks that many difficulties will be avoided, the methods of transformation of units will be generalized, and the limits of our knowledge kept more clearly in view. Though the dimensions of K and μ cannot be determined, it is easily shown that those of the product $K^{\frac{1}{2}}\ \mu^{\frac{1}{2}}$ are $L^{-1}\ T$. Mr. Blakesley, in commenting on thermal units, strongly protested against the use of the word "*therm*" as a name for the unit of heat. If used at all, it should be reserved for the unit of temperature. Referring to the choice of fundamental units, he reminded the Society that the dimensions of quantities expressed in the electro-static or electro-magnetic systems become identical if the unit velocity be the velocity of light, and by choosing the unit of time as a suitable decimal part of a day, the relations between electrical and practical mechanical units could be simplified. Prof. Carey Foster, after discussing the effect of defining specific heat as a ratio, or as a quantity of heat as the dimensions of temperature, pointed out that, as quantity of heat = temperature × entropy, the dimensions of temperature would be determinate if those of entropy were found. Prof. S. P. Thompson considered that part of the difficulties of dimensional equations arose from the fact that no distinction was made between *scalar* and *vector* quantities. Thus the dimensions of work and moment of a force are given as ML^2T^{-2}, whereas the true representation for the latter would be $ML^2T^{-2}\sqrt{-1}$, because the line by which the force is multiplied is at right angles to the force. By similar considerations, Ampère's rule for the force between two parallel current elements can be derived from the magnetic equation $\frac{m\,.\,m'}{r^2} = f$, for, replacing m and m' by equivalent current elements, $i\,.\,ds$ and $i\,.\,ds'$, the equation becomes—

$$f = \frac{\sqrt{-1}\ i\,.\,ds\,.\,\sqrt{-1}\ i\,.\,ds'}{r^2}$$

$$= \frac{-i^2 ds\,.\,ds'}{r^2}.$$

Referring to the use of "therm," Dr. Thompson concurred with the remarks of Mr. Blakesley, and thought the word "calorie" answered all requirements. He also considered that thermal equations were greatly simplified by always expressing specific heat in ergs. Prof. Ayrton was of opinion that students experienced much greater difficulty in dealing with electrical units than with thermal ones, and thought part of this was due to the vague way in which some of the standard text-books treated the subject. With reference to the force exerted by quantities of electricity, Prof. Perry and himself had pointed out that specific inductive capacity must be taken into account, for, contrary to Faraday, they had found it to be different in different gases. In reply, Prof. Rücker said he often explained the identity of the dimensions of work and moment of a force, by considering moment as measured by the work done in rotating through unit angle, the dimensions of angle being zero as regards L, M, and T. He also pointed out that, in Bayne's "Thermodynamics," specific heats are always expressed in ergs. In thanking Prof. Rücker for his interesting paper, the President expressed his conviction that, by paying attention to the points considered, the difficulties arising from the two systems of units would be considerably diminished.

Chemical Society, November 15.—Mr. W. Crookes, F.R.S., in the chair.—The following papers were read:—The principles of thermo-chemistry, by Mr. S. U. Pickering. The author rejects the thermo-chemical principles enunciated by Thomsen, Naumann, and Berthelot, not only on special grounds, but on the more general ground that they depend on an impossible distinction between chemical and physical actions. A satisfactory explanation of all known thermo-chemical facts is derived from the recognition of the laws of dissociation and the hydrate theory of dissolution. Every act of combination must be accompanied by the evolution of heat, and in interactions where heat is absorbed this absorption must be due to the fact that, one or more of the agents being partially dissociated at the temperature of the interaction, the removal of one of the products of the dissociation necessitates a further decomposition of the agent. The heat evolved must also be a direct measure of the affinities saturated; and, of two possible interactions, that which evolves more heat must occur to the exclusion of the other. The cases of endothermic changes which present difficulties are those in which liquids and solids are concerned. The heat absorbed when many solids are dissolved in liquids cannot be explained by the fusion, but only by the volatilization of the solid. A mass of water contains some fundamental molecules possessing an energy of 10,000 cal. greater than the average molecular aggregates constituting the mass. These can therefore combine with the salt, and effect its volatilization with an evolution of heat, even if the heat of volatilization be nearly 10,000 cal.; other water aggregates then dissociate to supply the place of the free molecules thus removed from the sphere of action. From theoretical considerations the author arrives at the conclusion that Berthollet's theory as to the division of a base between two acids is correct, and argues that the facts observed are in accordance with these conclusions, and are entirely opposed to the existence of the so-called "avidity" or "affinity" constants advocated by Ostwald and others. In the discussion which followed the reading of the paper, Prof. Ramsay, F.R.S., said that he did not believe in the universal presence of complex molecules in liquids and solids, nor did he exclude the existence of such; the researches of Prof. Young and himself, he thought, conclusively established the absence of a complex molecular structure in such liquids as ethyl alcohol and ether, whilst, on the other hand, Henry's arguments testified to the complexity of the molecules of certain oxides, such as silica. With regard to water, which specially formed the subject of Mr. Pickering's remarks, it was to be noted that, whilst the vapour-density pointed to molecular simplicity, other arguments drawn from its behaviour when examined by Raoult's method were in favour of moderate molecular complexity. Prof. Armstrong, F.R.S., remarked that by taking into account the action of water, Mr. Pickering had advanced what appeared to be a rational explanation of many facts which hitherto had appeared paradoxical.—Note on the mixture of propyl alcohol and water, by Prof. Ramsay, F.R.S., and Prof. Young. The authors have determined the vapour-pressures of a mixture of propyl alcohol and water in the proportions $C_3H_8O : H_2O$, and like Konowalow, arrive at results adverse to the conclusion that a definite hydrate exists. Chancel found that this mixture distils over to the last drop at 87°·5 under 738 mm. pressure, but the authors find that the composition of the mixture of constant boiling-point varies with the pressure under which distillation takes place.—Note on the action of nitric acid on ammonium chloride, by Dr. F. E. Matthews. The principal gaseous product of the action of nitric acid on ammonium chloride in solution is nitrous oxide, and not nitrogen, as has been previously stated; the gas is mixed with small quantities of chlorine and oxychloride of nitrogen.—Ethylic cinnamyldiethacetate, by the same.—The isomeric sulphonic acids of β-naphthylamine, by Mr. A. G. Green. Three acids—the α-, β-, and γ-acids—are known to be formed when β-naphthylamine is sulphonated with ordinary sulphuric acid at 100°, but the author finds, as was to be expected, that the δ-acid is also present. The analogous behaviour of hydroxy- and amido-compounds makes it probable that β-naphthol on sulphonation gives four isomeric sulphonic acids, although two only have hitherto been isolated, and the author's experiments confirm this view, inasmuch as he has succeeded in isolating a third acid—corresponding to the β-naphthylamine-δ-sulphonic acid—from the product formed on sulphonating β-naphthol at 100°. In the discussion which followed, Prof. Armstrong, F.R.S., and Mr. Wynne pointed out that the formula adopted by Mr. Green as representing the constitution of the β-naphthylamine-α-sulphonic acid was at variance with the views put forward by Cleve and others, and could not be accepted; Mr. Green, in reply, defending his view that the α-acid is an ortho-compound, mainly on the ground that it and the corresponding β-naphtholsulphonic acid differed so greatly in properties from their isomerides.—The constitution of the dichloronaphthalenes, especially the $\alpha\beta$-compounds, by Prof. Armstrong, F.R.S., and Mr. W. P. Wynne. The three possible $\alpha\alpha$- and the two possible heteronucleal $\beta\beta$-dichloronaphthalenes are known, and formulæ have been ascribed to them which almost certainly are correct expressions of their constitutions. The authors point out that the four possible $\alpha\beta$-dichloronaphthalenes are also known, and draw attention to the somewhat discrepant statements on record relating to the so-called θ-modification, melting at about 61°. The authors have found (Brit. Assoc. Report, 1887, p. 231) that under this designation two distinct dichloronaphthalenes have been regarded as one, and now bring forward evidence showing that one of these, melting at 61°·5, is a homonucleal, and the second, melting at 64°, is a heteronucleal αβ-derivative. They confirm Cleve's view that the dichloronaphthalene, melting at 34°, is a homonucleal αβ-compound, the dichloronaphthalene melting at 48° being the remaining heteronucleal αβ-derivative. With regard to the constitution of the two homonucleal αβ-dichloronaphthalenes, the authors show that that melting at 61°·5 must be the *meta*-compound (that melting at 34° being, by exclusion, the ortho-derivative), since their experiments prove that so-called α-dichloronaphthalene, melting at 38°, and obtained by treating naphthalene tetrachloride with alcoholic potash, is a mixture of two homonucleal dichloronaphthalenes—namely, the αβ-derivative melting at 61°·5, and the αα-derivative melting at 68°. Sufficient data have not yet been obtained to determine the constitution of the heteronucleal αβ-dichloronaphthalenes.—Piazine derivatives, by Dr. A. T. Mason. A continuation of the author's work on a class of compounds formerly known as ketines, and more recently as pyrazines.

Anthropological Institute, November 27.—Francis Galton, F.R.S., President, in the chair.—The President exhibited a gold breastplate from an ancient Peruvian grave.—Mr. F. W. Rudler exhibited a collection of ethnological objects from the Jivaros of the Upper Amazons, and the Arawaks and the Acaways of the interior of British Guiana.—Mr. G. F. Lawrence exhibited two Palæolithic implements from the valley of the Thames, near Erith.—Mr. Osbert H. Howarth read a paper on the survival of corporal penance, and exhibited specimens of the "*disciplinas*," or scourges, which are still used, in public penance, in the village of Fenaes d'Ajuda, a remote community on the north coast of St. Michael's, Azores.—The Secretary read a paper by the Rev. Benjamin Danks on marriage customs of the New Britain Group.

PARIS.

Academy of Sciences, December 3.—M. Daubrée in the chair.—Observations of the minor planets made with the great meridian instrument of the Paris Observatory during the first half of the year 1888, by M. Mouchez. The right ascension and polar distance, with correction of ephemerides, are tabulated for Diana, Danaë, Athamantis, Astrea, Parthenope, Flora, Sappho, Hebe, Cyrene, Germania, and five other minor planets.—On the satellites of Mars, by M. H. Poincaré. The paper deals with M. Dubois's recent hypothesis (*Comptes rendus*, August 20, 1888), that Phobos and Deimos were originally small planets, which a few years ago passed within the attraction of Mars. This hypothesis, which is based on the fact that the two satellites were never observed before 1877, is shown to be inadmissible by a consideration of the eccentricity of the orbit of Mars, and on other grounds. Although the eccentricity of Mars is about six times greater than that of the earth, it can be demonstrated that the elements of its moons cannot have perceptibly varied during the last hundred years.—On the preparation of the phosphorescent sulphides of calcium and strontium, by M. Edmond Becquerel. The author, who has lately resumed the study of these sulphides, now finds that some of the added substances, when employed alone, fail to produce any appreciable effect, and that the simultaneous presence of several is sometimes necessary for the preparation of strongly luminous bodies. The modifications depend not only on the nature of the mixed substances, but also on that of the phosphorescent sulphide itself.—On the invariants of differential equations, by M. E. Goursat. Since M. Halphen's researches on linear differential equations, M. Appell and others have extended the notion of invariants to differential equations of a more or less general form for certain special categories of transformations, without, however, determining in a general way the existence of these invariants. The determination is here effected by a demonstration based on Herr Lie's *Theorie der Transformationsgruppen*, (Leipzig, 1888).—On the dark waters of the equatorial regions, by MM. A. Muntz and V. Marcano. For the purpose of ascertaining the cause of the dark colour so characteristic of numerous affluents of the Amazons and Orinoco, the authors have analyzed some specimens from the upper course of the latter river. They conclude that the discoloration is due to the free humic acids held in solution, and derived from the decomposition of vegetable matter on a granite soil free from lime. The liquid is thus in some respects of the nature of bog-water, and the colour persists because, in the absence of lime, the phenomena of nitrification, and consequently the combustion of the organic matter, cannot take place, as shown by the complete absence of nitrates. The waters themselves are perfectly limpid, wholesome, and palatable, for although the discoloration is primarily due to their chemical composition, its intensity must be attributed to phenomena of reflection produced by the great depth of the liquid masses.—On the benzoic acetals of mannite and its homologues; decomposing action of benzoic aldehyde, by M. J. Meunier. The acetal of mannite is readily obtained by dissolving it in hydrochloric or sulphuric acid, adding a corresponding quantity of benzoic aldehyde and shaking; the mixture is rapidly transformed to acetal and solidifies. When a benzoic acetal, and doubtless others also, is completely freed from the excess of aldehyde, it resists the action of the acids as well as of the alkalies, and is not decomposed by prolonged boiling with acidulated water. In the presence of the aldehyde, on the contrary, decomposition takes place very rapidly by boiling, and all the more rapidly the greater the excess of aldehyde, even if the liquid be but slightly acidulated, containing, for instance, not more than 1 per cent. of sulphuric acid. Benzoic aldehyde thus influences the hydration of the acetal and the consecutive formation of mannite.—Action of the sulphide of carbon on clays; production of the oxysulphide of carbon, by M. Armand Gautier. During his researches on the mineralizing elements of thermal waters, the author has been led to attempt the synthesis of the oxysulphide of carbon by causing the vapours of the sulphide of carbon to act at red heat on the natural silicates, and especially on the argillaceous earths. These essays have been successful, and a method is here described which alone can furnish the oxysulphide of carbon, COS, in a pure state and in large quantities.—Transformation of terpilene into a menthene, by MM. G. Bouchardat and J. Lafont. By exposing terpine, $C_{20}H_{16},2H_2O_2$, for fifteen hours at 100° C. to twenty times its weight of aqueous hydriodic acid saturated at 0°, the authors have produced a dihydriodate of crystallized terpilene, $C_{20}H_{16},2HI$, identical with the dihydriodate of the essence of terebinthine. From their further researches they conclude that natural menthol should perhaps be grouped with the terpilene series.—On a spermaceti whale taken in the Azore waters, by Prince Albert of Monaco. Photographs are given of the head of a large spermaceti whale harpooned last summer in the neighbourhood of the Azores. It measured from the eye to the upper extremity of the mouth 1·90 metre, and from the under jaw to the lip 1·16 metre.—Papers are contributed by M. G. Saint-Remy on the brain of the spider family; and by M. A. Giard on *Peroderma cylindricum*, Heller, a parasite of the sardine.

BERLIN.

Physical Society, November 16.—Prof. du Bois-Reymond, President, in the chair.—Prof. von Bezold made a further communication on the thermo-dynamics of the atmosphere, in continuation of a statement made to the Society earlier in the year. After briefly recapitulating the processes which occur during the adiabatic expansion of a mass of air as it rises, he introduced into thermo-dynamic considerations a new idea, brought forward by Helmholtz, and found to be extremely convenient. The idea is that of "potential temperature," or in other words the absolute temperature assumed by a mass of air when it comes adiabatically under normal pressure. The speaker then propounded the following as a general law: "Whenever a mass of air changes its condition adiabatically, the potential temperature is never diminished, it is usually increased, and sometimes is unchanged." This law was proved from a number of examples. During the adiabatic alterations of pressure and volume in the currents of air as they rise and fall, the temperature should fall, on the average, about 1° C. for a height of 100 metres; as a matter of fact, the fall is really less than 1° C. This is due to the fact that under natural conditions the processes do not occur adiabatically, since near the earth's surface and above the level of the clouds warming and cooling influences are brought to bear on the air. In an anticyclone the powerful radiation from the earth leads to a cooling of the lower strata of air, and to this is due the fall of temperature observed at all stations which are situated on a height, a phenomenon which, according to the speaker, must also make its appearance at lower levels during maximal pressures of the air in winter and during the night. In cyclones the fall of temperature with increasing altitude similarly differs from its theoretical value, since warm air from the neighbouring anticyclone becomes mixed with the colder air as it is rising, owing to the whirling motion : as a result of this, the formation of clouds must be most dense in the centre of the cyclone, and thinner towards its periphery. The latent heat liberated during the condensation accompanying cloud-formation is only obvious in the anticyclone, since it merely slows the rate of cooling in the rising current of air; on the other hand, the cold rain-drops as they fall cool the lower layers of air in a cyclone, so that as a result of the above a mixed convection of heat takes place from the cylone in the direction of the anticyclone. These thermo-dynamic considerations explain in general a large number of meteorological phenomena of which the speaker was only able to enumerate a few.—Dr. Budde made some remarks in connection with Janssen's communication to the last meeting of the British Association on the double spectrum of oxygen, of which one is proportional to the density of the gas, the other to the square of that density. He showed that on the supposition that one of the spectra is due to separate free molecules, the other to molecules which are impacting, the result must follow which Janssen has found experimentally.

Physiological Society, November 23.—Prof. du Bois-Reymond, President, in the chair.—Prof. Moebius spoke on the nests which are constructed by the marine stickleback (*Gasterosteus*). As early as 1829 the fact that this animal constructs a nest was described by an English observer. The speaker had had frequent opportunities of examining these nests in the Baltic, and found that they are constituted not only out of Fuci, Algæ, and other marine plants, but also out of the leaves of terrestrial plants which have fallen into the water, and even sometimes out of bits of wool. The male, who is constantly circling round the nest, knows how to find it again, even if it is lifted and lowered again into the water at a distance of five hundred paces from its first position. In an aquarium the speaker was able to observe that the male is continually spinning new fibres round the nest which proceed from out of the urinary bladder. The fibres are, as shown by chemical reactions, composed of mucin, which is not, however, secreted in the bladder, but by the kidneys. Sections through a kidney, treated with osmic acid and stained with hæmatoxylin, showed that only a few of the cells lining the uriniferous tubes are concerned in the elaboration of mucin, the others undergoing no such change. Out of the breeding-season none of these mucigenous cells are to be found in the kidneys, which are then less swollen. A case analogous to the above, of nests constructed of mucin derived from temporarily modified gland-cells, is found in Salangane, which produce the edible nests; these birds make use of a glutinous material for the construction of their nests, which is at times secreted by a gland, in this case the salivary gland. A comparative physiological-chemical analysis of these two secretions would be very interesting.—Prof. Munk gave an account of his researches on the physiology of the thyroid gland. It has long been known that in cases of excision of this gland in man the patients suffer from severe cachexia, to which they speedily succumb, with symptoms indicative of serious disease of the central nervous system; this fact has led to a long series of physiological researches, from which it appears that this small organ is of the greatest importance to life. It was assumed, in accordance with Schiff's views, either that it produces some substance which, passing into the blood, upsets the normal function of the central nervous system, or that it is concerned in the destruction of some injurious products of cerebral activity. Two years ago, as the speaker began his researches on the physiology of this gland, with a view to the discovery of the above remarkable substance, he observed solitary cases in which the dogs were only slightly ill, and then completely recovered, notwithstanding that the thyroid was completely extirpated; one dog showed no signs of any illness at all. Similarly in the literature of this subject, solitary cases are mentioned in which extirpation had no effect on the dog's health. The speaker had next changed his method of operating, merely isolating the gland from the surrounding structures, ligaturing the hilus, and replacing the isolated lobes in their original position. Some of the dogs with the gland thus isolated lived on in perfect health; in these the gland was found to have degenerated and become completely converted into connective-tissue. Others of the dogs became ill and died, and in these the gland had healed and recovered its vascular supply. From these experiments it followed that the thyroid is not an organ of absolute importance for life, inasmuch as animals can live in perfect health without it. It thus remained to determine what is the cause of the serious pathological condition and ultimate death which ensues when the thyroid is excised in man and other animals. A careful study of the symptoms showed that the normal functions of respiration, cardiac activity and nutrition, and of the nervous system, are upset, resulting in dyspnœa with powerful expirations, palpitation of the heart, relaxation of the arteries, derangement of the movements of deglutition, accompanied by vomiting, clonic and tonic cramps, resulting in epileptic attacks. It was further found that the dyspnœa and palpitation are primary symptoms, the cramps are secondary, and that death ensues during the latter. The dyspnœic attacks with the resultant conditions are undoubtedly due to the stimulation of nerves lying in the inflamed tissues after the extirpation of the gland, viz. the superior laryngeal, recurrent laryngeal, vagus, and sympathetic nerves. This is clearly shown by the fact that when the gland is simply isolated by a ligature the dogs live in good health, the gland at the same time degenerating, whereas in cases where the surrounding tissues inflame and lead to a renewed adhesion and vascularity of this organ the dogs became ill and died. The speaker was obliged to defer to the next meeting, owing to the lateness of the hour, the further description of his experiments, and of the conclusions to be drawn from them.

BOOKS, PAMPHLETS, and SERIALS RECEIVED.

The Mining Manual for 1888: W. R. Skinner.—The Speaking Parrots, parts 7 and 8; Dr. K. Russ (L. U. Gill).—British Dogs, Nos. 25 and 26: H. Dalziel (L. U. Gill).—A Text-book of Elementary Metallurgy: A. H. Hiorns (Macmillan).—Mental Evolution in Man: G. J. Romanes (Kegan Paul).—Die Stämme des Thierreiches (Wirbellose Thiere), vol. ii.: M. Neumayr (Temsky, Wien).—Essai d'une Théorie Rationnelle des Sociétés de Secours Mutuels: P. de Lafitte (Paris, Gauthier-Villars).—Cours d'Astronomie Pratique; Application à la Géographie et à la Navigation, 2me partie: E. Caspari (Paris, Gauthier-Villars).—The Agreement of Colour Theories with Practical Experience: G. H. Morton (Liverpool).—The Proposed Chemical Laboratory at the University of Sydney: A. Liversidge (Sydney).—Journal of the Chemical Society, December (Gurney and Jackson).—Proceedings of the Linnean Society of New South Wales, vol. iii. part 1 (Trübner).

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